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ABSTRACT

Major findings from both the research effort in early education and the prekindergarten experiments undertaken by the School District of University City are summarized briefly in this report. The research effort began in 1963 upon receipt of a three-year Ford Foundation Grant. As a first step, a survey was conducted among teachers to identify problems of major concern. Learning problems of children proved to be a high priority item. Research literature related to the learning problems of children affecting development of skills in motor, multi-sensory, visual, cognitive, and language areas was intensely examined between 1963 and 1965. In 1966, a grant from the federal government made possible the establishment of experimental prekindergartens for 100 four-year-olds in two consecutive years. Discussed in this report are: early local research findings: interim end of year findings; resulting program impact; prediction of achievement and logical reasoning to strengthen learning; Teachers' interest in research; and discussion. References, two bibliographies, and an appendix highlight background source material. (WY)

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REVIEW OF SELECTED EARLY EDUCATION RESEARCH in the School District of University City

Office of
Research and Testing

School District of University City
University City, Missouri

June 1970

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FOREWORD

Studies in early education began in 1963 upon receipt of a three-year Ford Foundation Grant. As a first step, a survey was conducted among teachers to identify problems of major concern. The fact that learning problems of children was a high priority item prompted the staff to make an intensive examination of research on learning between 1963 and 1965.

Two research summaries made an especially strong impact on the staff. In reviewing a number of research studies, Almy (1964) concluded that intelligence is not fixed at birth but emerges as it is nurtured by appropriate experiences. From his own research investigations, Bloom (1964) emphasized that early experience is of crucial importance in determining both the rate and the final level of development, and that one hour spent fruitfully with young children is worth hundreds of hours of remedial teaching of failing students in the upper grades. Other research findings and literature stressed the importance of skills development and the positive relationship of each skill area to intellectual growth: motor-Kephart (1960), multi-sensory-Montessori (1965), visual-Frostig (1964), cognitive-Piaget (1952), and language-Vygotsky (1962). These studies are cited in Bibliography A.

A grant in 1966 from the Bureau of Research, United States Office of Education, made possible the establishment of experimental prekindergartens in two consecutive years. Particular attention was given to skills development. Major findings from these experiments and follow-up studies to date are summarized briefly in this report. A final report will be completed in July 1970.

Alice O. Coffman, Project Director
James M. Dunlap, Principal Investigator

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REVIEW OF SELECTED EARLY EDUCATION RESEARCH
in the
School District of University City
University City, Missouri

June 1970

A research study to determine the long range effects of individual programming for prekindergarten children based on assessment of developmental needs was begun in October 1966. Its purpose was to discover early those areas in which a child might have learning difficulties that could be reduced by providing appropriate tailor-made experiences in the classroom. The experiment was financed by a four year grant from the Bureau of Research, United States Office of Education. This grant was one of a very few offered by the Bureau of Research to a public school system.

Attention was focused on five skill areas basic to the intellectual growth, the development of which are necessary before a child can master more formal learning such as reading and arithmetic. Specific programs were provided for children whose development was lagging in motor, auditory, visual, or language skills. Children whose skills were normal or better were assigned to a cognitive group. Because of limited numbers of children with certain skill needs, the five groups were taught in four classes each of the two years. In prekindergarten, children participated for 20 minutes daily throughout the school year in activities to meet their special needs. The remainder of the half-day session was devoted to the usual early education programs to foster social, physical, and emotional growth. Experimental children who attended the prekindergarten center both in 1966-1967 (First Round), and in 1967-1968 (Second Round), were matched each year with a comparable group of control children. Follow-up of development of all four groups has been conducted annually. Presently, the children are enrolled in the first and second primary years. Six booklets, prepared by the director and her staff, describing the activities and materials developed for use by children, parents, and teachers, are listed in Bibliography B.

EARLY LOCAL RESEARCH FINDINGS

Developmental Skills of Four-Year-Olds in University City.

A group of 100 representative children were chosen by lot to attend the experimental prekindergartens. They were "matched" with similar groups of control children for purposes of making comparisons at a later time.

Scores on the tests given prior to prekindergarten showed the experimental children to have twice as many strengths as weaknesses. This finding indicated better than the average development, typical of the University City school population (1)*.

*Numbers in parentheses indicate studies cited in References.

Identification of Developmental Skills Needs.

Significant differences in test performance distinguish five basic skills development areas in which some children needed specific programs: 1. Motor, 2. Auditory, 3. Visual, 4. Language, and 5. All Skills Intact (2).

Some of the skills measured by the tests appear to develop normally with age, others may be improved through practice provided in special programs. Skills which best respond to practice need not be the same for boys as for girls. Results from this study showed that auditory skills develop somewhat more slowly for boys, visual skills more slowly for girls, than the other skills tested (3)*.

INTERIM END OF YEAR FINDINGS

1966-1967.

Prekindergarten, First Round. Results from the first year of the prekindergarten indicated that children given a program designed to help overcome a weakness (experimental group) made significant gains compared with children who had no such program (control group). They also made greater gains in a number of skill areas not specifically programmed for them. The cognitive class (all skills intact), scored highest of the four classes on tests given both at the beginning (pretest) and at the end (posttest) of the prekindergarten year. The motor class, which scored lowest on the pretests, made the greatest over-all growth in skills. Throughout the study, sex differences appeared, more girls than boys showing substantial growth in both language and cognitive or intellectual development (4).

1967-1968.

Prekindergarten, Second Round. Again, experimental children showed significantly greater gains than their control counterparts. Experimental boys compared with control boys with specific skill needs scored higher on measures of motor skills, visual skills, language skills, and cognition (intelligence). Experimental girls with specific needs scored higher than control girls with similar needs on measures of visual skills, language skills, and cognition. In general, children who made the lowest initial scores on a specific measure improved most. Greater experience of teachers and the development of additional materials and appropriate activities resulted in more and greater gains by children during the second prekindergarten experiment. The findings point clearly to the importance of early identification of specific developmental needs and the necessity of providing programs to strengthen skills at an early age if children are to make optimum progress through school (5).

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*A brief description of the tests cited in this report is given in the Appendix.

Kindergarten, First Round. Experimental children did not maintain their superiority over control children during their kindergarten year (5). This outcome tends to support the studies by Hess and Baer (6) who found that control groups generally make rapid gains once they are exposed to stimulating school experiences. However, the major test used in the study lacked sufficient "top" on most of its nine subtests to provide reliable results for exceptionally capable children. A 1968 revision helped to remedy this short-coming. Later, local research showed that the experimental group regained some of its lost superiority by the end of the first primary year.

1968-1969.

Kindergarten, Second Round. Results from the third year of research showed boys in this experimental group to be superior in skills development to boys in the control group and superior to their boy predecessors in the Kindergarten, First Round, as well. Also experimental boys in the Motor-Auditory class excelled their control counterparts in tests of readiness for the first primary year. Girls in the experimental group excelled control girls in a reading test using the initial teaching alphabet (7).

Primary One, First Round. The results pointed to the superiority of experimental children, especially boys, compared with control children both in skills development and in reading (7).

Discussion of the 1968-1969 Findings. Results in both kindergarten and the first primary year support, in part, the original contentions which were major objectives for these experiments, that:

1. Children who participate in a personalized program in prekindergarten, based on assessment of their developmental skills, will increase their intellectual abilities, and will learn at a higher level than children without these experiences.

2. The same prekindergarten children will retain their superiority through kindergarten and the first primary year.

RESULTING PROGRAM IMPACT

Program Expansion.

Since 1966, the individual assessment of basic skills, together with the development of provisions to strengthen children with observed weaknesses and to challenge children already possessing obvious strengths, have encouraged the extension and adaptation of many of the prekindergarten activities to enhance children's learning in kindergarten, and the first and second primary years.

Assessment of Kindergarten Entrants. The experimental prekindergarten Assessment Test Battery requiring 90 minutes to administer, was streamlined to a 30 to 35 minute short-form test battery which, since 1967, has been given to all entering kindergarten children. This short-form kindergarten test has been revised, refined, and re-normed a number of times as aids to the testers (8, 9, 10, 11, 12, 13, 14) each time more know-how was gained from the prekindergarten follow-up studies. Presently kindergarten teachers administer the tests with the assistance of resource teachers and elementary guidance counselors, when needed. The test results provide a basis for personalizing programs for each kindergarten child.

Individual Testing. Beyond kindergarten, older children sometimes present learning difficulties. To help pinpoint a child's specific weaknesses, either the short-form or the complete test battery is used frequently in diagnosis. Although the tests were devised to measure children under the ages of nine or ten, in instances of severe learning difficulties, they have been found useful even with some children of junior high school age.

New Programs.

A direct outgrowth of the prekindergarten experiments was the organization of a tuition prekindergarten in 1968-1969 conducted by many of the same teachers and aides. The following year, an experimental kindergarten was established by Arts in General Education (CEMREL). Applicants for this program were chosen randomly from among children who had attended the tuition prekindergarten the previous year. Both programs are scheduled to continue in 1970-1971.

PREDICTION OF ACHIEVEMENT AND LOGICAL REASONING TO STRENGTHEN LEARNING

Predicting achievement can provide to teachers much information they need to help children attain optimal achievement.

Using test scores and other data collected for more than three years of experimentation and follow-up, several additional studies have increased our knowledge of how children's learning can be enhanced. The information gained is especially important to classroom teachers who guide children's activities daily.

Prediction of Readiness for, and Achievement in the First Primary Year.

Two short tests used in the complete Early Education Assessment Battery in the prekindergarten were found especially reliable statistically in predicting performance on tests of readiness for the first primary year

which are given at the end of kindergarten. These tests measure cognition and auditory memory (15). Since these abilities do not seem to be related to a child's increasing age (3), it may be assumed that once identified they can be strengthened through appropriate school experiences which the classroom teacher can provide.

The best indicators of ways to strengthen children's achievement (including reading, spelling, and arithmetic) during the first primary year have been a test of cognition (15) and readiness tests for the first primary year (16), the latter being slightly more reliable statistically. Even better predictors may yet be found through subsequent research. The readiness tests are currently administered at the end of the kindergarten year. Again, a teacher's knowledge of children's skills development based on test results can be used to strengthen achievement.

Skills Development of Children Identified as Excellent, Good, and Average in Reading and Arithmetic.

Skills development tests of the complete assessment battery differentiated between excellent, good, and average groups better for boys than for girls in both reading and arithmetic (17).

In reading, four basic skill tests differentiated the three groups of boys (17). Two of the skills appeared to respond to training. For girls, only one skill test differentiated the three reading groups (17). Again, this skill may be improved with practice (3).

In arithmetic, nine skill tests differentiated the three groups of boys (17), all but two of which appeared to respond to appropriate school experiences (3). For girls, five skill tests differentiated the three arithmetic groups (17), four of which may be improved with practice, while only one skill seemed to be more dependent upon age than experience (3).

With so many basic developmental skills subject to improvement through practice, these two researches have provided teachers with valuable guides for raising the level of reading and arithmetic achievement in the classroom.

The Relationship of Logical Thinking to Other Selected Tests of Cognition.

According to Piaget's theories, children's ability to think logically in a particular situation develops through three degrees of success. In this study, the ability of three identifiable groups of kindergarten children to reason logically was related to abilities measured by other cognitive tests including number concepts. Again, sex differences were found. For both sexes, results showed statistically reliable relationships between logical thinking and intelligence, and between logical thinking and the ability to relate concepts presented orally. For boys, the ability to think logically was also related to the ability to reproduce sequences of digits and to mastery of number concepts (18).

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TEACHERS INTEREST IN RESEARCH

During the current school year, classroom teachers have begun to study on their own, the effects of experiments and innovations which they introduced in their classrooms.

Two kindergarten teachers have experimented with team teaching this year and are evaluating the outcomes in terms of growth in developmental skills.

One first year primary teacher is examining the effect of using a new method of introducing reading to a small group of children.

A prekindergarten teacher has studied the relationship of mixed dominance to success in reading.

A physical education instructor is implementing a special motor skills program with a small group having learning difficulties and is planning to study the effects of the program not only on motor skills, but on reading as well.

DISCUSSION

The prekindergarten research and follow-up studies have provided considerable information about how children develop and learn which hitherto has not been readily available nor necessarily pertinent to the specific University City school population.

Early education programs are not a panacea for all the learning problems children may encounter. However, out of the several studies undertaken during the prekindergarten experimental years and follow-up have come a body of teaching materials and methods which have been shown to help children strengthen weaknesses and find new challenges in the better use of skills in which they excel.

This review will be far from complete even after the final test data are collected and analyzed, and the final July 1970 report is written. Many more studies need to be made, and the data already collected need to be scrutinized further. Research is a continuous process in which each finding suggests another facet to be studied.

Most of the research on early education has been conducted in colleges and universities--new tests which have made the present studies possible, analyses of programs which are effective and those which are not, the investigations of how children learn, the development of theories, and many others. Without the significant contributions which preceded them, our studies would not have been possible. To theorists and practitioners alike, the University City investigators pay tribute.

Grateful thanks are especially extended to parents, teachers, aides, and the many assistants who have contributed to local program development, testing, and research in the education of young children. Moreover, without the interest, enthusiasm, and support of the Board of Education, the Administration, the Ford Foundation, and the United States Office of Education, these studies could not have been initiated.

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APPENDIX

DESCRIPTION OF TESTS
USED IN THESE STUDIES

THE ILLINOIS TEST OF PSYCHOLINGUISTIC ABILITIES

Auditory Reception: Ability to understand materials presented verbally.

Example: Do chairs eat? Yes, No
Do ponies shave? Yes, No

Visual Reception: Ability to understand visual symbols.

Example: Picture a dog. Find another (different) dog.

Auditory Association: Ability to relate concepts presented orally.

Example: A daddy is big, a baby is _____.
Grass is green, sugar is _____.

Visual Association: Ability to relate concepts presented visually.

Example: Dog goes with the bone.
Tennis ball goes with the racket.

Verbal Expression: Ability to express concepts vocally.

Example: "Tell me all about a ----- nail." (A nail is shown to the child.)

Manual Expression: Ability to express ideas manually.

Example: Show me what to do with a ------ hammer. (Pictured)

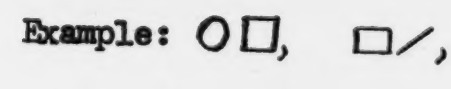
Grammatic Expression. Ability to respond automatically to often repeated verbal expression of standard American speech.

Example: Here is a dog, here are two _____.

Auditory Sequential Memory: Ability to reproduce sequences of digits increasing from two to eight digits.

Example: 2 - 2, 9 - 1, 6-4-7.

Visual Sequential Memory: Ability to reproduce sequences of non-meaningful figures.

Example: 

DEVELOPMENTAL TEST OF VISUAL-MOTOR INTEGRATION

Perception of and ability to copy a series of geometric forms.

PEABODY PICTURE VOCABULARY TEST

Ability to indicate the meaning of a spoken word by designating one of four pictures.

METROPOLITAN READINESS TESTS

Readiness for the first primary year measured by facility in word meaning, listening, matching, alphabet recognition, numbers, and copying.

TEST OF INITIAL READING SUCCESS (i.t.a.) Devised locally.

Measures facility with sounds and symbols, ability to blend symbols, and reading comprehension.

SLOSSON INTELLIGENCE TEST

Provides an intelligence quotient (I.Q.), which is the relationship between mental age (M.A.) and chronological age (C.A.).
I.Q. = M.A./C.A.

CONCEPT ASSESSMENT KIT - CONSERVATION

A Piaget-type test of logical reasoning which measures the ability to recognize that certain properties of an object such as substance, weight, volume, or number may remain the same even though the form, shape, color, or position are changed.